Department of EEE

Capstone Project Handbook

October 2021

Table of Contents

1. Introduction

Capstone Project is a senior design project work that takes place during the final year of 4 years engineering curriculum of B.Sc. in Electrical and Electronic Engineering. It spans three trimesters with the following course breakdown:

1. EEE 400-A, Capstone Project I, 1.5 Credit (Referred to as CP1 as well)
2. EEE 400-B, Capstone Project II, 2.0 Credit (Referred to as CP2 as well)
3. EEE 400-C, Capstone Project II, 3.0 Credit (Referred to as CP3 as well)

Capstone Project must reflect culminating activities of the student where s/he would showcase knowledge, skills and attitudes learned in the earlier courses.

2. Eligibility and Procedure

A student will be eligible to take EEE 400-A if s/he completes minimum **84** credit hours of study. The students must form a group during the early days of the course EEE 400A. A group consists of **five** to **six** members. The group would remain the same for the courses EEE 400-A, EEE 400-B and EEE 400-C. In the subsequent two trimesters, the students will take EEE 400-B and 400-C. Therefore, EEE 400-A is the prerequisite of EEE 400-B and similarly, EEE 400-B is the prerequisite of EEE 400-C. Although, the completion of the capstone project is a continuous journey for a year, the student's grade will be based on his/her performance and demonstration in each of these three courses in three trimesters, separately. This will ensure that the students remain serious and committed from the inception when they embark on taking EEE 400-A and follow up with supporting and implementation activities in EEE 400-B and EEE 400-C, subsequently.

3. Structure of the Capstone Project

CP1	**CP2**	**CP3**
Coordinator		Coordinator
Mentor	Mentor	Mentor

4. General Information

- Maximum number of concurrent projects mentored by a faculty member: 4
- (Recommended) number of students per project group: 5
- There will be coordinator(s) assigned for CP1 and CP3 to take class on a weekly basis and coordinate among the students and the mentors.
- There will be mentors assigned for CP1, CP2 and CP3.

5. Selection of a Mentor and External Mentor

5.1. Mentor

The students' group should talk to their desired faculty member(s) who would be interested to become the mentor of the group. After the faculty member agrees preliminary to become the mentor, the group should fill up a form (can be found in section 11) collecting the signature of the faculty member providing the respective consent. After the submission of the form, the department will finally assign the mentor for a particular group after checking the availability of the mentor as a faculty member cannot be a mentor of more than **four** project groups at a given time. A mentor will work as a guide and advise the students towards the successful completion of the project. However, it is emphasized that the students in the group will solely be responsible for the successful completion of the capstone project. Capstone project should be considered by the students as a showcase platform of their knowledge, skills and attitude that they have learned in their previous years of academic activities. Thus, mentor will act merely as a guide and an advisor towards the successful completion of the students' project.

5.2. External Mentor

The students can also approach an external mentor from the industry and outside of United International University (UIU) with the approval of the academic moderation committee (AMC) and Head of the department. If the department agrees on the allocation of an external mentor after the due process through the application from a project group, it will also assign an internal mentor to oversee the quality of the project. With the presence of the external mentor, the load of the internal mentor will be considered half of the full-time mentorship. It is to be noted that any faculty member or staff of other department or institute inside UIU will be considered as internal mentor, if s/he is approved by the department after the due process.

6. Program Outcome Mapping

The project works should map to all the 12 program outcomes (POs) of B.Sc. in EEE Engineering Program. Furthermore, the group project should include standards of the professional body like Institute of Engineers (IEB). The name of the POs along with the descriptions are listed in Table 1.

Table 1: Description of POs of B.Sc. in EEE Engineering Program

PO	Name	Description
PO1	Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of **complex engineering problems**.
PO2	Problem analysis	Identify, formulate, research the literature and analyze **complex engineering problems** and reach substantiated conclusions using first principles of mathematics, the natural sciences and the engineering sciences.
PO3	Design/development of solutions	Design solutions for **complex engineering problems** and design system components or processes that meet the specified needs with appropriate consideration for public health and safety as well as cultural, societal and environmental concerns.
PO4	Investigation	Conduct investigations of **complex problems**, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

PO5	Modern tool usage	Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to **complex engineering activities** with an understanding of the limitations.
PO6	The engineer and society	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PO7	Environment and sustainability	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics	Apply ethical principles and commit to professional ethics, responsibilities and the norms of the engineering practice.
PO9	Individual work and teamwork	Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings.
PO10	Communication	Communicate effectively about **complex engineering activities** with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions.
PO11	Project management and finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member or a leader of a team to manage projects in multidisciplinary environments.
PO12	Life-long learning	Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.

7. Complex Engineering Problems

Engineering problems that cannot be resolved without in-depth engineering knowledge and have some or all of the characteristics mentioned in Table 2 are considered as complex engineering problem.

The **Range of Complex Engineering Problem Solving** is given below:

Table 2: Range of Complex Problem Solving

Attribute	Complex Problems
Range of conflicting requirements	Involve wide-ranging or conflicting technical, engineering and other issues
Depth of analysis required	Have no obvious solution and require abstract thinking and originality in analysis to formulate suitable models.
Depth of knowledge required	Requires research-based knowledge, much of which is at, or informed by, the forefront of the professional discipline and that allows a fundamental-based, first-principles analytical approach
Familiarity of issues	Involve infrequently encountered issues
Extent of applicable codes	Are outside problems encompassed by standards and codes of practice for professional engineering

Extent of stakeholder involvement and level of conflicting requirements	Involve diverse groups of stakeholders with widely varying needs
Consequences	Have significant consequences in a range of contexts
Interdependence	Are high-level problems that include many component parts or sub-problems

8. Complex Engineering Activities

Complex activities are (engineering) activities or projects that have some or all of the characteristics mentioned in Table 3. The attributes of complex engineering activities are given below:

Table 3: Range of Complex Engineering Activities

Attribute	Complex Problems
Range of resources	Involve the use of diverse resources (for this purpose, resources include people, money, equipment, materials, information and technologies)
Level of interaction	Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues
Innovation	Involve creative use of engineering principles and research-based knowledge in novel ways
Consequences to society and the environment	Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation
Familiarity	Outside problems encompassed by standards and codes of practice for professional engineering

9. Choosing a Topic for Capstone Project

The topic of Capstone project should reflect the passion and profound interest of the group of students. The students should choose the topic that is realistic and has practical value and applications. The project idea may come from the experience, thoughts and learning of the students during their earlier years of studies. The students are also highly encouraged to survey and analyze societal and industrial needs of the community and the region and find a potential problem that can be addressed for a solution through their implementation of the project. Upon completion, the students should be proud of their completed project and should share their learning outcomes to the prospective employers.

10. Course Activities

10.1. EEE 400-A

EEE 400-A would introduce different soft skill-sets that are necessary for the successful completion of Capstone Project. The skill-sets include, but not limited to, mastering effective communications, individual and team development, ethical leadership, project management, the steps in the design process, environment and sustainability, etc. These soft skill sets would be developed by a series of seminars and workshops. Further, the developed soft skill sets would map some of the 12 POs of the Washington Accord (WA) such as PO8 (Ethics), PO9 (Individual and teamwork), PO10 (Communication), PO11 (Project management and finance), PO12 (Lifelong learning). The outcomes

relevant to POs would be measured based on the student performance in different tests designed to assess those specific skills. The standard rubrics will be used to assess the performance. At the end of the trimester the students will submit a proposal of their Capstone Project and give a presentation to defend their proposals. The breakdown of the overall evaluation is given in section 16.

Specifics of Proposal: There will be a workshop where the students will be taught how to write a proposal following a given template. The proposal should provide the following information:

- Title of the Project
- Names of the Group Members
- Introduction to the Project: Motivation and problem statement on a complex problem chosen for the project.
- Literature Review: What are the current practices on the stated problem?
- Method: How the stated problem will be solved?
- PO Mapping: Addressing how the different activities, that are to be completed in the project, will map to12 POs.
- Project Planning: Week- and trimester-wise planning for the tasks for implementing the project.
- Conclusions: Concluding remarks about the expectations on possible outcomes.

10.2. EEE 400-B

In this course the students will implement the proposal that is accepted in the course EEE 400-A. The progress of EEE 400-B will be strictly monitored by the mentor following a standard rubric. The progress of the project needs to be reported to the mentor by the respective project group through a weekly group meeting following specific weekly schedule prescribed by the department. The breakdown of the overall evaluation is given in section 16.

10.3. EEE 400-C

In this course, the project group will complete the implementation of the capstone project they have proposed and progressed through the courses EEE 400-A and EEE 400-B, respectively. The progress of EEE 400-C will be strictly monitored by the mentor following a standard rubric. The progress of the project needs to be reported to the mentor by the respective project group through a weekly group meeting following specific weekly schedule prescribed by the department. The breakdown of the overall evaluation is given in Section 16.

11. Capstone Project Proposal Declaration Form

EEE 400 Capstone Project Declaration

Department of Electrical and Electronic Engineering

United International University
QUEST FOR EXCELLENCE

Instruction:

1. ***Please read the Capstone Project Handbook carefully before you proceed to fill up the form.***
2. ***Please type the form.***

Project Group Members*:				
Sl.	**Name**	**ID**	**Email**	**Mobile No.**
1.	Chair*:			
2.	Recorder*:			
3.	Member:			
4.	Member:			
5.	Member:			
6.	Member:			

** Each capstone project group should consist of **5-6** members. The Chair is responsible for coordinating the team efforts, convening team meeting, distributing the tasks among the team members, monitoring the team's overall progress. The recorder will keep records in the weekly journal with the help of all the team members and have it signed by the mentor.*

Title of the Project

Extended Abstract*

**Please use an additional page to write within 500 words the extended abstract of the project. It should outline the motivation, the problem statement of the project. Also, the proposed method needs to be presented in a brief manner. It should also underscore how the success of the project outcome will be measured.*

Mentor of the Project

Name:

Designation with affiliation:

Number of existing project under guidance:

Signature of the proposed mentor on his/her agreement to guide the project group:

_____

The above section should be filled up by the proposed mentor.* ***A mentor cannot guide more than 4 groups at any given time. Therefore, the number of existing project group under guidance cannot be more than 4 considering the fact that one group will complete their project in the current trimester.*

Proposed External Mentor (if any)*

Name:

Designation with affiliation:

Number of years of work experience:

Number of existing project under guidance:

Signature of the proposed external mentor on his/her agreement to guide the project group:

_____

**It is optional. If necessary, the external mentor can be chosen from the industry.*

Recommendation form the Research, Publication, Thesis and Library Committee (RPTLC)

We are recommending the following (*Please tick the appropriate choice*):

- □ 1. The title and the abstract of the project without any correction.
- □ 2. The title and the abstract of the project with correction.
- □ 3. The name of the mentor without any change.
- □ 4. The name of the mentor with change.
- □ 5. The name external mentor (if any) without any change.
- □ 6. The name external mentor (if any) with change.

[*Please specify the correction/change (if any for choice 2, 4 and/or 6) in a separate sheet*]

Name and Signature of the Convenor of RPTLC

_____

Final Approval by the Head of the Department

Comment:

Signature of the Head (EEE)

_____

12. Operational Guideline for Capstone Project 1

12.1. Responsibility of CP1 Coordinator(s):

CP1 coordinators will:

- Take classes.
    - **CP1 course content:**
        - ❏ How to make an effective and engaging presentation?
        - ❏ How to search for literature?
        - ❏ How to cite literature?
        - ❏ What is plagiarism? How to do the plagiarism checking?
        - ❏ How to write a scientific report? Stress must be provided on regular writing of literature review, results etc.
        - ❏ How to engage him/herself in effective time management?
        - ❏ Project management and initial draft of Gantt chart preparation.
- Collect proposals from the groups and their choice of mentors.
- Call on a meeting with RPTLC to evaluate the proposals and to assign mentors for the CP1 groups.
- Send the duly filled up Capstone Project Declaration forms to the head / department for approval.
- Notify the mentors and the students about the mentor selection.
- Arrange presentation for CP1 students by doing the following:
    - Prepare and email presentation schedule to the faculties, students and the department.
    - Email the grading rubric to the faculties.
    - Prepare the grading platform (using Google-sheet or eLMS) by inputting group number, project name, student name, student ID, presentation time, grading rubric etc.
    - Coordinate the presentation event.
- Prepare the grade-sheets and assign grades to the groups.
- Consult with the respective mentors about the grades of their students before submitting the grade to the department.
- Submit the grades to the department by the last date of grade submission of the university.
- Hand over the journals, presentations etc. to the undergraduate coordinator to ensure that the students do not show the same content in CP2 presentations. This will enable the graders to measure the progress during CP2.

12.2. Responsibility of CP1 Mentors

CP1 mentors will:

- Mentor the groups in technical aspects.

- Help the students to answer “three whats- what is the problem, what is the issue, what is the solution” of a project.
- Help the students to prepare their presentation to represent their three “whats” in front of audience.
- Hand over their portion of the marks to the coordinator for CP1 in due time.

12.3. Responsibility of the UG Coordinator

The UG coordinator will:

- Update the google document that lists the ongoing projects and the respective mentors before the start of the trimester.
- Update the above-mentioned documents again after the mentors are assigned
- Receive journals, presentations etc. from the CP1 project coordinator(s) at the end of the trimester.

12.4. Responsibility of the Deputy Registrar

The deputy registrar will:

- Post the schedule of CP1 presentation on the notice board and in the departmental website.
- Collect journals, presentations etc. from the CP1 project coordinator(s) and store it in the repository.

12.5. CP1 Timeline

Week 1	
Week 2	
Week 3	
Week 4	The coordinator(s) will call on a meeting with RPTLC to evaluate the proposals and to assign mentors for the CP1 groups.
Week 5	The coordinator(s) will send the duly filled up Capstone Project Declaration forms to the head / department for approval.
Week 6	The coordinator(s) will notify the mentors and the students about the mentor selection.
Mid-week	
Week 8	
Week 9	
Week 10	The coordinator will set up the schedule for presentation and send it to the department for posting to notice board and website. (S)he will also email the grading rubric to the faculties.
Week 11	● Students will share the draft oral presentation with the mentor and the coordinator for review. ● The coordinator will prepare the grading platform (using Google-sheet or eLMS) by inputting group number, project name, student name, student ID, presentation time, grading rubric etc. and share it with the faculties. ● The coordinator will invite the students and the faculties to the presentation with the video conferencing link.
Week 12	Oral presentation.
Week 13	Students will share the draft of the report with the mentor and coordinator for review.

Final-week	
Last day of final	Students will submit the final report and the final presentation.
Last day of grade submission	Last date of grade submission of the CP1 as well.

12.6. CP1 Grade Submission

- Project coordinator(s) will submit the grade.
- The last date of grade submission is the same as the central last date of grade submission of the trimester.
- It is the responsibility of the project coordinator(s) to collect numbers from all the concerned people / source.
- The Coordinator(s) will:
    - Download the grade-sheet from UCAM.
    - Modify the headers of the grade-sheet keeping the number of the columns fixed (as the template for the grade-sheet is that of the lab course).
    - Populate the grade-sheet with numbers.
    - Upload the grade-sheet in UCAM.
    - Give a hardcopy of the grade-sheet to the department.
    - Share the final report and the final presentation with the department in a .zip file. It will be the deputy registrar's responsibility to collect these files and store it in the repository. The naming convention will be as follows:

[Trimester] CP1 Documents → Group [Group ID] → Group [Group ID] Trimester [Trimester] CP1 Report.docx

[Trimester] CP1 Documents → Group [Group ID] → Group [Group ID] Trimester [Trimester] CP1 Presentation.pptx

Example:

203 CP1 Documents → Group 203-03 → Group 203-03 Trimester 203 CP1 Report.docx

203 CP1 Documents → Group 203-03 → Group 203-03 Trimester 203 CP1 Presentation.pptx

13. Operational Guideline for Capstone Project 2

13.1. Responsibility of CP2 Coordinator(s)

- There is no coordinator in CP2.

13.2. Responsibility CP2 Mentors

CP2 mentors will:

- Download the Attendance sheet from UCAM at the very beginning of the trimester. It has to be done to ensure that all of his/her students completed CP2 registration.
- Mentor the groups in technical aspects.
- Set the target of each group with a Gantt chart after CP1 presentation.
- Schedule and hold at least one meeting per week with the students.
- Advise his/her group(s) to make a good quality understandable presentation.
- Help the students to answer "three whats- what is the problem, what is the issue, what is the solution" of a project.
- Help the students to prepare their presentation to represent their three "whats" in front of audience.
- Prepare the grade-sheets and assign grades to the group(s) within the last date of grade submission of the university.

13.3. The Responsibility of the UG Coordinator

The UG coordinator will:

- Distribute journals, presentations etc. collected from the CP1 project coordinator(s) of the last trimester to the respective CP2 mentors of the current trimester at the start of the trimester.
- Set up the schedule for presentation and send it to the department for posting to notice board and website. (S)he will also email the grading rubric to the faculties.
- Prepare the grading platform (using Google-sheet or eLMS) by inputting group number, project name, student name, student ID, presentation time, grading rubric etc. and share it with the faculties.
- Invite the students and the faculties to the presentation with the video conferencing link.
- Receive journals, presentations etc. from the CP2 mentors at the end of the trimester.

13.4. Responsibility of the Deputy Registrar

The deputy registrar will:

- Create sections for each group and assign those with their respective mentor(s).
- Post the schedule of CP2 presentation on the notice board and in the departmental website.
- Collect journals, presentations etc. from the CP2 mentors and store it in the repository.

13.5. CP2 Timeline

Week 1	Mentors will set the target of each group with a Gantt chart after CP1 presentation. Regular group meetings are required.
Week 2	Mentors will advise his/her group(s) to make a good quality understandable presentation.
Week 3	
Week 4	
Week 5	
Week 6	
Mid-week	
Week 8	
Week 9	
Week 10	The UG coordinator will set up the schedule for presentation and send it to the department for posting to notice board and website. (S)he will also email the grading rubric to the faculties.
Week 11	● Students will share the draft oral presentation with the mentor for review. ● The UG coordinator will prepare the grading platform (using Google-sheet or eLMS) by inputting group number, project name, student name, student ID, presentation time, grading rubric etc. and share it with the faculties. ● The UG coordinator will invite the students and the faculties to the presentation with the video conferencing link. ● The project coordinator of CP1 will coordinate the presentation.
Week 12	Oral presentation.
Week 13	Students will share the draft of the report with the mentor for review.

Final-week	
Last day of final exam	Students will submit the final report and the final presentation.
Last day of grade submission	Last date of grade submission of the CP2 as well.

13.6. CP2 Grade Submission

- Mentor will submit the grade.
- The last date of grade submission is the same as the central last date of grade submission of the trimester.
- Mentors will download the grade-sheet from UCAM.
- It is the responsibility of the mentors to collect numbers from all the concerned people / source.
- The mentors will:
    - Download the grade-sheet from UCAM.
    - Modify the headers of the grade-sheet keeping the number of the columns fixed (as the template for the grade-sheet is that of the lab course).
    - Populate the grade-sheet with numbers.
    - Upload the grade-sheet in UCAM.
    - Give a hardcopy of the grade-sheet to the department.
    - Share the final report and the final presentation with the department in a .zip file. It will be the deputy registrar's responsibility to collect these files and store it in the repository. The naming convention will be as follows:

[Trimester] CP2 Documents → Group [Group ID] → Group [Group ID] Trimester [Trimester] CP2 Report.docx

[Trimester] CP2 Documents → Group [Group ID] → Group [Group ID] Trimester [Trimester] CP2 Presentation.pptx

Example:

203 CP2 Documents → Group 202-03 → Group 202-03 Trimester 203 CP2 Report.docx

203 CP2 Documents → Group 202-03 → Group 202-03 Trimester 203 CP2 Presentation.pptx

14. Operational Guideline for Capstone Project 3

14.1. Responsibility of CP3 Coordinator(s)

CP3 coordinators will:

- Take classes.
    - **CP3 course content:**
        - ❏ How to make an effective and engaging presentation?
        - ❏ Guide the students to compile their report on Capstone Project.
        - ❏ What is plagiarism? How to do the plagiarism checking?
        - ❏ Check the plagiarism of their report and guide them accordingly how to create an original paper.
        - ❏ How to cite literature?
        - ❏ How to relate the project with 12 POs?
- Arrange presentation for CP3 students by doing the following:
    - Prepare and email presentation schedule to the faculties, students and the department.
    - Email the grading rubric to the faculties.
    - Prepare the grading platform (using Google-sheet or eLMS) by inputting group number, project name, student name, student ID, presentation time, grading rubric etc.
    - Coordinating the presentation event.
- Prepare the grade-sheets and assign grades to the groups.
- Consult with the respective mentors about the grades of their students before submitting the grade to the department.
- Submit the following to the Head of the department as a regular grade submission (on/before the first class of the next trimester):
    - Section grade sheet.
    - For each group:
        - ■ Group grade sheet.
        - ■ Tunitin report.
        - ■ Final report, presentation and poster.

14.2. Responsibility of CP3 Mentors

CP3 mentors will:

- Mentor the groups in technical aspects.
- Guide the students to complete the project in due time.
- Make the students to answer “three whats- what is the problem, what is the issue, what is the solution” of a project.
- Make the students to prepare their presentation to represent their three “whats” in front of audience.
- Guide the students to relate their project with 12 POs.

- Hand over their portion of the marks and the turnitin report to the CP3 coordinator in due time.

14.3. Responsibility of the UG Coordinator

The UG coordinator will:

- Distribute journals, presentations etc. collected from the CP2 mentors of the last trimester to the CP3 coordinator of the current trimester at the beginning of the trimester.
- Receive journals, presentations etc. from the CP3 project coordinator(s) at the end of the trimester.

14.4. Responsibility of the Deputy Registrar

The deputy registrar will:

- Create a section for CP3 coordinator.
- Post the schedule of CP3 presentation on the notice board and in the departmental website.
- Collect journals, presentations etc. from the CP3 coordinator and store it in the repository.

14.5. CP3 Timeline

Week 1	
Week 2	Coordinator will send an email regarding the final presentation of the students
Week 3	
Week 4	
Week 5	
Week 6	
Mid-week	
Week 8	
Week 9	First draft of the project report has to be collected from the students by mentor and coordinator.

Week 10	The coordinator will set up the schedule for presentation and send it to the department for posting to notice board and website. (S)he will also email the grading rubric to the faculties.
Week 11	Students will share the draft oral presentation with the mentor and coordinator for review.
Week 12	
Week 13	● Students will update the report based on the feedback of the mentor and the coordinator and share the second draft of the report with the mentor and coordinator for review. ● The coordinator will prepare the grading platform (using Google-sheet or eLMS) by inputting group number, project name, student name, student ID, presentation time, grading rubric etc. and share it with the faculties. ● The coordinator will invite the students and the faculties to the presentation with the video conferencing link.
Final-week	
Week after final	Oral presentation and poster presentation.
Last day of final report and presentation submission	Students will submit the final report and the final presentation (two days after the oral presentation).
Last day of grade submission	Prescheduled date (on/before the first class of the next trimester).

14.6. CP3 Grade Submission

- Project coordinator will submit the grade.
- The last date of grade submission is on/before the first class of the next trimester (prescheduled date).
- It is the project coordinator's responsibility to collect numbers from all the concerned people / source.
- The Coordinator(s) will:
    - Download the grade-sheet from UCAM.

    - Modify the headers of the grade-sheet keeping the number of the columns fixed (as the template for the grade-sheet is that of the lab course).
    - Populate the grade-sheet with numbers.
    - Upload the grade-sheet in UCAM.
    - Give a hardcopy of the grade-sheet to the department.
- Submit the following to the Head of the department as a regular grade submission (on/before the first class of the next trimester):
    - Section grade sheet.
    - For each group:
        - Group grade sheet.
        - Tunitin report.
        - Final report, presentation and poster.
- It will be the deputy registrar's responsibility to collect these files and store it in the repository. The naming convention will be as follows:

[Trimester] CP3 Documents → Group [Group ID] → Group [Group ID] Trimester [Trimester] CP3 Turnitin Report.pdf

[Trimester] CP3 Documents → Group [Group ID] → Group [Group ID] Trimester [Trimester] CP3 Report.docx

[Trimester] CP3 Documents → Group [Group ID] → Group [Group ID] Trimester [Trimester] CP3 Presentation.pptx

[Trimester] CP3 Documents → Group [Group ID] → Group [Group ID] Trimester [Trimester] CP3 Poster.pptx

Example:

203 CP3 Documents → Group 203-03 → Group 201-03 Trimester 203 CP3 Turnitin Report.pdf

203 CP3 Documents → Group 203-03 → Group 201-03 Trimester 203 CP3 Report.docx

203 CP3 Documents → Group 203-03 → Group 201-03 Trimester 203 CP3 Presentation.pptx

203 CP3 Documents → Group 203-03 → Group 201-03 Trimester 203 CP3 Poster.pptx

15. Course Outcome

This section lists the course outcomes (COs) of CP1, CP2 and CP3.

15.1. Course Outcomes (COs) of CP1, CP2 and CP3

CO	CP 1	Corr. PO	CO	CP 2	Corr. PO	CO	CP 3	Corr. PO
CO1	Identification of the topic designed for a given specification.	PO12	CO1	Investigate the feasibility of different solutions to select the most suitable one.	PO4	CO1	Design and implement the solutions that meet the specifications.	PO3
CO2	Critically review and analyze the problems for possible solutions.	PO2	CO2	Design and implement the solutions that meet the specifications.	PO3	CO2	Plan a project and perform different tasks of project management	PO11
CO3	Plan a project and perform different tasks of project management.	PO11	CO3	Plan a project and perform different tasks of project management.	PO11	CO3	Incorporate the use of modern engineering tools in the design and verification processes.	PO5
CO4	Assess societal, health, safety, legal and cultural issues related to the project.	PO6	CO4	Incorporate the use of modern engineering tools in the design and verification processes.	PO5	CO4	Practice ethical and professional responsibilities in the practice of electrical and electronic engineering.	PO8
CO5	Demonstrate the understanding of the impact of the project on environment and sustainability.	PO7	CO5	Practice ethical and professional responsibilities in the practice of electrical and electronic engineering.	PO8	CO5	Write professional and technical documents related to the project and orally present project results.	PO10
CO6	Understand and practice ethical and professional responsibilities in the practice of electrical and electronic engineering.	PO8	CO6	Write professional and technical documents related to the project and orally present project results.	PO10	CO6	Work effectively in a team.	PO9
CO7	Write professional and technical documents related to the project and orally present project results.	PO10	CO7	Work effectively in a team.	PO9	CO7	Cite relevant references from appropriate sources and discuss the learning gaps and accomplishments under perceived difficulties.	PO12
CO8	Work effectively in a team.	PO9	CO8	Cite relevant references from appropriate sources and discuss the learning gaps and accomplishments under perceived difficulties.	PO12			

15.2. CO Evaluation of CP 1

PO	Name	CO	CO Description	Oral	Report	Journal	Soft Skills
PO12	Engineering Knowledge	CO1	Identification of the topic designed for a given specification.		Abstract (5%) Introduction, Motivation and Problem Statement (10%)		
PO2	Problem analysis	CO2	Critically review and analyze the problems for possible solutions.		Literature Review (5%) Attributes of Complex Engineering Problem Achieved (5%)	Technical ability (analytical, design skill, usage of modern tools) (10%)	
PO3	Design / development of solutions						
PO4	Investigation						
PO5	Modern tool usage						
PO6	The engineer and society	CO4	Assess societal, health, safety, legal and cultural issues related to the project.		PO Mapping (10%)		
PO7	Environment and sustainability	CO5	Demonstrate the understanding of the impact of the project on environment and sustainability.		PO Mapping (10%)		Quiz (20%)
PO8	Ethics	CO6	Understand and practice ethical and professional responsibilities in the practice of electrical		Compliance to the formatting and plagiarism (5%) Professionalism (5%)	Work ethics (commitment to the group work) (10%)	Quiz (20%)

PO	Name	CO	CO Description	Oral	Report	Journal	Soft Skills
			and electronic engineering.				
PO9	Individual work and teamwork	CO8	Work effectively in a team.	Time Management, Visual Aid, Slide Design (Group Performance) (50%)		Participation in weekly group meeting (10%) Overall performance in group work (10%) Teamwork (10%)	Quiz (20%)
PO10	Communication	CO7	Write professional and technical documents related to the project and orally present project results.	Organization of the Talk, Confidence (Individual Performance) (50%)	Conclusion (5%) Standard of English and over all presentation (5%)		Quiz (20%)
PO11	Project management and finance	CO3	Plan a project and perform different tasks of project management.		Method (30%) Project Management and Finance (5%)	Weekly progress (individual) (10%) Schedule maintenance (10%) Hours spent in a week (individual) (10%) Perseverance for successful completion (10%)	Quiz (20%)
PO12	Life-long learning						

15.3. CO Evaluation of CP2

PO	Name	CO	CO Description	Oral	Report	Journal
PO1	Engineering Knowledge					
PO2	Problem analysis					
PO3	Design / development of solutions	CO2	Design and implement the solutions that meet the specifications.		Method (Implementation, results) (45%)	Technical ability (analytical, design skill, usage of modern tools) (5%)
PO4	Investigation	CO1	Investigate the feasibility of different solutions to select the most suitable one.		Abstract (5%) Introduction, Motivation and Problem Statement (10%) Literature Review (5%)	
PO5	Modern tool usage	CO4	Incorporate the use of modern engineering tools in the design and verification processes.			Technical ability (analytical, design skill, usage of modern tools) (5%)
PO6	The engineer and society					
PO7	Environment and sustainability					
PO8	Ethics	CO5	Practice ethical and professional responsibilities in the practice of electrical and electronic engineering.		Compliance to the formatting (5%) Professionalism (5%) Plagiarism check (5%)	Work ethics (commitment to the group work) (10%)
PO9	Individual work and teamwork	CO7	Work effectively in a team.	Time Management, Visual Aid, Slide Design		Participation in weekly group meeting (10%)

PO	Name	CO	CO Description	Oral	Report	Journal
				Group Performance (50%)		Overall performance in group work (10%) Teamwork (10%)
PO10	Communication	CO6	Write professional and technical documents related to the project and orally present project results.	Organization of the Talk, Confidence Individual Performance (50%)	Standard of English and over all presentation (5%)	
PO11	Project management and finance	CO3	Plan a project and perform different tasks of project management.		Project Management (Time management) (10%)	Weekly progress (individual) (10%) Schedule maintenance (10%) Hours spent in a week (individual) (10%) Perseverance for successful completion (10%)
PO12	Life-long learning	CO8	Cite relevant references from appropriate sources and discuss the learning gaps and accomplishments under perceived difficulties.		Conclusion (5%)	Life-long learning (10%)

15.4. CO Evaluation of CP3

PO	Name	CO	CO Description	Oral	Report	Journal	Hardware	Poster
PO1	Engineering Knowledge							
PO2	Problem analysis							
PO3	Design / development of solutions	CO1	Design and implement the solutions that meet the specifications.		Abstract (5%) Introduction, Motivation and Problem Statement (10%) Literature Review (5%) Attributes of Complex Engineering Problem Achieved (5%) Method (Implementation, results) (15%)	Technical ability (analytical, design skill, usage of modern tools) (5%)	Hardware / Software Implementation (20%)	
PO4	Investigation							
PO5	Modern tool usage	CO3	Incorporate the use of modern engineering tools in the design and verification processes.		PO Mapping (20%)	Technical ability (analytical, design skill, usage of modern tools) (5%)		
PO6	The engineer and society							

PO	Name	CO	CO Description	Oral	Report	Journal	Hardware	Poster
PO7	Environment and sustainability							
PO8	Ethics	CO4	Practice ethical and professional responsibilities in the practice of electrical and electronic engineering.		Compliance to the formatting (5%) Professionalism (5%) Plagiarism check (5%)	Work ethics (commitment to the group work) (10%)	Quality of Workmanship (20%) Originality (20%)	
PO9	Individual work and teamwork	CO6	Work effectively in a team.	Time Management, Visual Aid, Slide Design Group Performance (50%)		Participation in weekly group meeting (10%) Overall performance in group work (10%) Teamwork (10%)	Overall Impression (20%)	Overall presentation (15%)
PO10	Communication	CO5	Write professional and technical documents related to the project and orally present project results.	Organization of the Talk, Confidence Individual Performance (50%)	Standard of English and over all presentation (5%)		Demonstration / Explanation (20%)	Abstract (15%) Objectives (15%) Methods (15%) Results (15%) Conclusions (15%)
PO11	Project management and finance	CO2	Plan a project and perform different tasks of project management.		Method (Implementation, results) (15%)	Weekly progress (individual) (10%) Schedule maintenance (10%) Hours spent in a week (individual) (10%)		

PO	Name	CO	CO Description	Oral	Report	Journal	Hardware	Poster
						Perseverance for successful completion (10%)		
PO12	Life-long learning	CO7	Cite relevant references from appropriate sources and discuss the learning gaps and accomplishments under perceived difficulties.		Conclusion and future reference (5%)	Life-long learning (10%)		References (10%)

15.5. Summary of CO Evaluation

CP 1						CP 2					CP 3						
PO	**CO**	**Oral**	**Report**	**Jour-nal**	**Soft Skills**	**PO**	**CO**	**Oral**	**Report**	**Jour-nal**	**PO**	**CO**	**Oral**	**Report**	**Jour-nal**	**Poster**	**Hard-ware**
PO1						PO1					PO1						
PO2	CO2		√			PO2					PO2						
PO3						PO3	CO2		√	√	PO3	CO1		√	√		√
PO4						PO4	CO1		√		PO4						
PO5						PO5	CO4			√	PO5	CO3		√	√		
PO6	CO4		√			PO6					PO6						
PO7	CO5		√		√	PO7					PO7						
PO8	CO6		√		√	PO8	CO5		√	√	PO8	CO4		√	√		√
PO9	CO8	√			√	PO9	CO7	√		√	PO9	CO6	√		√	√	√
PO10	CO7	√	√		√	PO10	CO6	√	√		PO10	CO5	√	√		√	√
PO11	CO3		√		√	PO11	CO3		√	√	PO11	CO2		√	√		
PO12	CO1		√			PO12	CO8		√	√	PO12	CO7		√	√	√	

16. Assessment Policy

The following assessment policy was approved in a DC meeting dated September 27, 2020 and has been practiced since then.

The sequence of weightage is: Coordinator-Mentor-Avg. of all. Also, all values in parenthesis are in %

CP	Attendance	Journal	Report	Quiz	Oral	Poster	Demonstration	Overall Contribution
400 A	10 (100-0-0)	15 (50-50-0)	25 (50-50-0)	30 (100-0-0)	20 (0-0-100)	-	-	(60-20-20)
400 B	10 (0-100-0)	40 (0-100-0)	30 (0-100-0)	-	20 (0-0-100)	-	-	(0-80-20)
400 C	5 (100-0-0)	25 (40-60-0)	30 (20-80-0)	-	15 (0-0-100)	5 (0-0-100)	20 (0-0-100)	(21-39-40)
All CP	8.3 [5-3.3-0]	26.7 [5.8-20.8-0]	28.3 [6.2-22.2-0]	10 [10-0-0]	18.3 [0-0-18.3]	1.7 [0-0-0-1.7]	6.7 [0-0-0-6.7]	(27-46.3-26.7)

During pandemic hardware demonstration was not arranged. Rather, the students included a video describing the setup and operation of their project during the oral presentation. Hence, the following grading rubric was followed for 400 C.

CP	Attendance	Journal	Report	Quiz	Oral	Poster	Demonstration	Overall Contribution
400 C	5 (100-0-0)	25 (40-60-0)	30 (20-80-0)	-	30 (0-0-100)	10 (0-0-100)		(21-39-40)

17. Rubrics

17.1. Journal Rubric for CP1

Excellent: Exceed expectation (A); Good: Meet expectation (B); Poor: Below expectation (C)

Assessment Criteria	Excellent 90-100	Good 80-89	Poor < 80	Total Marks	CO Marking	CO	Description of CO	Corr. PO
Weekly progress (individual)				10	10%	CO3	Plan a project and perform different tasks of project management	PO11
Schedule maintenance				10	10%			
Hours spent in a week (individual)				10	10%			
Participation in weekly group meeting				10	10%	CO7	Work effectively in a team	PO9
Overall performance in group work				10	10%	CO7	Work effectively in a team	PO9
Perseverance for successful completion				10	10%	CO3	Plan a project and perform different tasks of project management	PO11
Teamwork				10	10%	CO7	Work effectively in a team	PO9
Life-long learning				10	10%	CO1	Identification of the topic designed for a given specification	PO12
Work ethics (commitment to the group work)				10	10%	CO6	Understand and practice ethical and professional responsibilities in the practice of electrical and electronic engineering.	PO8

17.2. Journal Rubrics for CP2

Excellent: Exceed expectation (A); Good: Meet expectation (B); Poor: Below expectation (C)

Assessment Criteria	Excellent 90-100	Good 80-89	Poor < 80	Total Marks	CO Marking	CO	Description of CO	Corr. PO
Weekly progress (individual)				10	10%	CO3	Plan a project and perform different tasks of project management	PO11
Schedule maintenance				10	10%			
Hours spent in a week (individual)				10	10%			
Participation in weekly group meeting				10	10%	CO7	Work effectively in a team	PO9
Overall performance in group work				10	10%	CO7	Work effectively in a team	PO9
Perseverance for successful completion				10	10%	CO3	Plan a project and perform different tasks of project management	PO11
Teamwork				10	10%	CO7	Work effectively in a team	PO9
Life-long learning				10	10%	CO8	Cite relevant references from appropriate sources and discuss the learning gaps and accomplishments under perceived difficulties.	PO12
Work ethics (commitment to the group work)				10	10%	CO5	Practice ethical and professional responsibilities in the practice of electrical and electronic engineering.	PO8
Technical ability (analytical, design skill, usage of modern tools)				10	5%	CO4	Incorporate the use of modern engineering tools in the design and verification processes.	PO5
					5%	CO2	Design and implement the solutions that meet the specifications.	PO3

17.3. Journal Rubrics for CP3

Excellent: Exceed expectation (A); Good: Meet expectation (B); Poor: Below expectation (C or below)

Assessment Criteria	Excellent 90-100	Good 80-89	Poor < 80	Total Marks	CO Marking	CO	Description of CO	Corr. PO
Weekly progress (individual)				10	10%	CO2	Plan a project and perform different tasks of project management	PO11
Schedule maintenance				10	10%			
Hours spent in a week (individual)				10	10%			
Participation in weekly group meeting				10	10%	C06	Work effectively in a team	PO9
Overall performance in group work				10	10%	C06	Work effectively in a team	PO9
Perseverance for successful completion				10	10%	CO2	Plan a project and perform different tasks of project management	PO11
Teamwork				10	10%	C06	Work effectively in a team	PO9
Life-long learning				10	10%	CO7	Cite relevant references from appropriate sources and discuss the learning gaps and accomplishments under perceived difficulties.	PO12
Work ethics (commitment to the group work)				10	10%	CO4	Practice ethical and professional responsibilities in the practice of electrical and electronic engineering.	PO8
Technical ability (analytical, design skill, usage of modern tools)				10	5%	CO3	Incorporate the use of modern engineering tools in the design and verification processes.	PO5
					5%	CO1	Design and implement the solutions that meet the specifications.	PO3

17.4. Report Rubric for CP1

Excellent: Exceed expectation (A); Good: Meet expectation (B); Poor: Below expectation (C or below)

Assessment Criteria	Excellent 90-100	Good 80 – 89	Poor < 80	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Abstract	Project goals and purposes are clear. Well written and concise summarizing the motivation, problem statement, objectives, method and expectations. No or very few grammatical errors	Project goals and purposes are more or less clear. Well written but not that concise summarizing the motivation, problem statement, objectives, method and expectations. Some grammatical errors are there.	Poorly stated. There are many grammatical errors.	5	5%	CO1	Identification of the topic designed for a given specification.	PO12
Introduction, Motivation and Problem Statement	Importance, motivation and problem statement for the chosen topic are clearly stated. The specifications of the target project are also clearly stated.	More or less clearly stated	Poorly stated.	10	10%			
Literature Review	Provides a significant review on past work and current state of the practices and relates well with the objectives of the project	Provides a review on past work and current state of the practices and relates with the objective of the project	Review is poorly written or absent. There is no relation with the stated objectives of the project.	5	5%	CO2	Critically review and analyze the problems for possible solutions.	PO2

Assessment Criteria	Excellent 90-100	Good 80 – 89	Poor < 80	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Attributes of Complex Engineering Problem Achieved	Attains at least four attributes of a complex engineering problem.	Attains three attributes of a complex engineering problem	Attains only two or less attributes of a complex engineering problem	5	5%			
Method	Proposed method is explained in a coherent manner with appropriate figures, table and data and step-by-step progression	Proposed method is explained; figures, tables and data are cited maintaining a standard	Proposed method is explained in an haphazard manner and it is hard to get any insight	30	30%	CO3	Plan a project and perform different tasks of project management	PO11
PO Mapping	States clearly how the project achieves the POs and also explain the future accomplished evidences (8 directly and 4 may indirectly)	Somewhat states how the project achieves the POs; the accompanied evidences are provided for some POs	Only states the POs without stating how those will be attained; no future evidences are provided.	20	10%	CO4	Assess societal, health, safety, legal and cultural issues related to the project	PO6
					10%	CO5	Demonstrate the understanding of the impact of the project on environment and sustainability.	PO7
Project Management and finance	Explains how the project will be managed with a future time line with an end of the next two trimesters. The potential cost of the project is explained with a part-list. The potential challenges and expectations are highlighted.	Project management is explained with a timeline and summary of the cost. There are few challenges and expectations.	Only a Gannt chart is provided without the other details. Cost is not estimated. The expectations and challenges are not highlighted.	5	5%	CO3	Plan a project and perform different tasks of project management	PO11

Assessment Criteria	Excellent 90-100	Good 80 – 89	Poor < 80	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Conclusion	Provides well written conclusion of project proposal along with future accomplishment.	Provides conclusion but does not provide any future expectations.	Conclusion is very brief. It does not conclude the project proposal.	5	5%	CO7	Write professional and technical documents related to the project and orally present project results.	PO10
Standard of English and over all presentation	Well written and publication standard. Few grammatical mistakes are present.	Does not meet publication standard but well written. Some grammatical mistakes are present.	Overall, the write-up is not well organized and flowing. Many grammatical mistakes are present.	5	5%			
Compliance to the formatting and plagiarism	All the font, paragraph, section headers, figures, tables are complied with IEEE format	Nearly complied with IEEE format	Not complied with IEEE format	5	5%	CO6	Understand and practice ethical and professional responsibilities in the practice of electrical and electronic engineering.	PO8
Professionalism	Exert professionalism in writing and delivery	Exert sincere effort on providing the best	Shows lack of sincerity	5	5%			

17.5. Report Rubric for CP2

Excellent: Exceed expectation (A); Good: Meet expectation (B); Poor: Below expectation (C or below)

Assessment Criteria	Excellent 90-100	Good 80-89	Poor < 80	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Abstract	Project goals and purposes are clear. Well written and concise summarizing the motivation, problem statement, objectives, method and expectations. No or very few grammatical errors	Project goals and purposes are more or less clear. Well written but not that concise summarizing the motivation, problem statement, objectives, method and expectations. Some grammatical errors are there.	Poorly stated. There are many grammatical errors.	5	5%	CO1	Investigate the feasibility of different solutions to select the most suitable one.	PO4
Introduction, Motivation and Problem Statement	Importance, motivation and problem statement for the chosen topic are clearly stated. The specifications of the target project are also clearly stated.	More or less clearly stated	Poorly stated.	10	10%			
Literature Review	Provides a significant review on past work and current state of the practices and relates well with the objectives of the project	Provides a review on past work and current state of the practices and relates with the objective of the project	Review is poorly written or absent. There is no relation with the stated objectives of the project.	5	5%			

Assessment Criteria	Excellent 90-100	Good 80-89	Poor < 80	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Method (Implementation, results)	Clear description of the methods used is provided. Methods are appropriate to address the problem/objective with sufficient and appropriate results.	Clear description of the methods used is provided. But the sufficient and appropriate results are not provided to corroborate the methods and its objectives.	Lack clear description of the methods and results are not sufficient to corroborate the methods and its objectives.	45	22.5%	CO2	Design and implement the solutions that meet the specifications.	PO3
					22.5%	CO4	Incorporate the use of modern engineering tools in the design and verification processes.	PO5
Project Management (Time management)	Explains clearly how the project is implemented with a planned time line and summary of the cost. The challenges and solutions are well explained.	Project management is explained with a timeline and summary of the cost. There are few challenges and expectations.	Only a Gannt chart is provided without the other details. Cost is not estimated. The expectations and challenges are not highlighted.	10	10%	CO3	Plan a project and perform different tasks of project management	PO11
Conclusion	Provides well written conclusion of the interim report along with future accomplishment.	Provides conclusion but does not provide any future expectations.	Conclusion is very brief. It does not conclude the report.	5	5%	CO8	Cite relevant references from appropriate sources and discuss the learning gaps and accomplishments under perceived difficulties.	PO12
Standard of English and over all presentation	Well written and publication standard. Few grammatical mistakes are present.	Does not meet publication standard but well written. Some grammatical mistakes are present.	Overall, the write-up is not well organized and flowing. Many grammatical mistakes are present.	5	5%	CO6	Write professional and technical documents related to the project and orally present project results.	PO10
Compliance to the formatting	Complied	Nearly complied	Not complied	5	5%	CO5	Practice ethical and professional responsibilities	PO8

Assessment Criteria	Excellent 90-100	Good 80-89	Poor < 80	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Professionalism	Exert professionalism in writing and delivery	Exert sincere effort on providing the best	Shows lack of sincerity	5	5%		in the practice of electrical and electronic engineering.	
Plagiarism check	Overall similarity is less than 15% and similarity from a single source except from literature review is less than 5%	Overall similarity is well above 15% but similarity from a single source except from literature review is less than 5%	Overall similarity is more than 30% or software is not used to check the plagiarism.	5	5%			

17.6. Report Rubric for CP3

Excellent: Exceed expectation (A); Good: Meet expectation (B); Poor: Below expectation (C or below)

Assessment Criteria	Excellent 90-100	Good 80-89	Poor < 80	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Abstract	Project goals and purposes are clear. Well written and concise summarizing the motivation, problem statement, objectives, method and expectations. No or very few grammatical errors	Project goals and purposes are more or less clear. Well written but not that concise summarizing the motivation, problem statement, objectives, method and expectations. Some grammatical errors are there.	Poorly stated. There are many grammatical errors.	5	5%	CO1	Design and implement the solutions that meet the specifications.	PO3
Introduction, Motivation and Problem Statement	Importance, motivation and problem statement for the chosen topic are clearly stated. The specifications of the target project are also clearly stated.	More or less clearly stated	Poorly stated.	10	10%			
Literature Review	Provides a significant review on past work and current state of the practices and relates well with the objectives of the project	Provides a review on past work and current state of the practices and relates with the objective of the project	Review is poorly written or absent. There is no relation with the stated objectives of the project.	5	5%			

Assessment Criteria	Excellent 90-100	Good 80-89	Poor < 80	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Attributes of Complex Engineering Problem Achieved	Attains at least four attributes of a complex engineering problem.	Attains three attributes of a complex engineering problem	Attains only two or less attributes of a complex engineering problem	5	5%			
Method (Implementation, results)	Clear description of the methods used is provided. Methods are appropriate to address the problem/objective with sufficient and appropriate results.	Clear description of the methods used is provided. But the sufficient and appropriate results are not provided to corroborate the methods and its objectives.	Lack clear description of the methods and results are not sufficient to corroborate the methods and its objectives.	30	15%	CO1	Design and implement the solutions that meet the specifications.	PO3
					15%	CO2	Plan a project and perform different tasks of project management	PO11
PO Mapping	States clearly how the project achieves the POs and also explain the future accomplished evidences (8 directly and 4 may indirectly)	Somewhat states how the project achieves the POs	Only states the POs without stating how those is attained; no evidences are provided.	20	20%	CO3	Incorporate the use of modern engineering tools in the design and verification processes.	PO5
Conclusion and future references	Provides well written conclusion of the report supported by appropriate and sufficient results along with future accomplishment.	Provides conclusion supported by appropriate and sufficient results but does not provide any future expectations.	Conclusion is very brief. It does not conclude the project proposal.	5	5%	CO7	Cite relevant references from appropriate sources and discuss the learning gaps and accomplishments under perceived difficulties.	PO12
Standard of English and	Well written and publication standard.	Does not meet publication standard but well written.	Overall, the write-up is not well organized and flowing. Many	5	5%	CO5	Write professional and technical documents related to the project and	PO10

Assessment Criteria	Excellent 90-100	Good 80-89	Poor < 80	Total Mark	CO Marking	CO	Description of CO	Corr. PO
over all presentation	Few grammatical mistakes are present.	Some grammatical mistakes are present.	grammatical mistakes are present.				orally present project results	
Compliance to the formatting	Complied	Nearly complied	Not complied	5	5%	CO4	Practice ethical and professional responsibilities in the practice of electrical and electronic engineering.	PO8
Professionalism	Exert professionalism in writing and delivery	Exert sincere effort on providing the best	Shows lack of sincerity	5	5%			
Plagiarism check	Overall similarity is less than 15% and similarity from a single source except from literature review is less than 5%	Overall similarity is well above 15% but similarity from a single source except from literature review is less than 5%	Overall similarity is more than 30% or turn-it-in software is not used to check the plagiarism.	5	5%			

17.7. Oral Presentation Rubrics for CP1, CP2 and CP3

17.7.1. Individual Performance

Assessment Criteria	4 [Excellent]	3 [Above Average]	2 [Average]	1 [Poor]
Volume and Clarity	Volume is loud and clear enough to be heard by all audience members throughout the presentation.	Volume is loud and clear to be heard by all audience members at least 75% of the time.	Volume is loud and clear to be heard by all audience members at least 60% of the time.	Volume is very low and unclear to be heard by all audience members.
Pronounciation, articulation & Accent	Polished, clear articulation / pronunciation; Right speaking rate and pauses. Native accent.	Clear pronunciation but not as polished; speaking rate and pauses mostly appropriate. No problem in accent.	Some mumbling; uneven speaking rate and pauses. Non-native tone in the accent.	Unclear pronunciation, very fast/slow speaking rate. Has problem in accent.
Eye Contact	Always has eye contact with audience.	Most of the time has eye contact with the audience.	Sometimes has eye contact with the audience.	Does not have eye contact with the audience.
Attire & Appreance	Business attire, very professional look or dress was built into theme of presentation.	Business Casual attire	Casual attire	General attire not appropriate for audience (jeans, t-shirt, shorts, hat).
Body Language, gesture & posture	Facial expressions and body language generate a strong interest and enthusiasm about the topic in others.	Facial expressions and body language sometimes generate a strong interest and enthusiasm about the topic in others.	Facial expressions and body language are used to try to generate enthusiasm but seem somewhat faked.	Very little use of facial expressions or body language. Did not generate much interest in topic being presented.
Organization of the talk	Strong and engaging introduction provides overview of presentation; presentation supports introduction; conclusion reinforces main points in memorable fashion.	Introduction provides overview of presentation; presentation supports introduction and ends with appropriate conclusion.	Some overview is given; connection between introduction and presentation is sometimes unclear; conclusion is limited.	Introduction does not give overview; organization is unclear, or presentation ends without conclusion.
Confidence and preparedness	The delivery is spontaneous – fluent and confident	The delivery generally seems effective. Some hesitancy may be observed.	The delivery was weak. Seems nerves.	Could not deliver. Very week

17.7.2. Group Performance

Assessment Criteria	**4 [Excellent]**	**3 [Above Average]**	**2 [Average]**	**1 [Poor]**
Time Management	Presentation is within the allotted time limit.	Presentation is within 1 minute +/- of the allotted time limit.	Presentation within 2 minutes +/- of the allotted time limit	Presentation is too long or too short.
Vusual Aids	Visuals are attractive and effectively enhance the presentation; show considerable originality illustrates important points.	A few visuals are not attractive, but all support the theme/content of the presentation.	All visuals are attractive, but a few do not seem to support the theme/content of the presentation.	Visuals are unattractive AND detract from the content of the presentation.
Formating of Slides	Background, font formats (colors, size, type), and graphics significantly enhance the presentation; no misspellings or grammatical errors.	Background, font formats, and graphics generally support the readability and content of the presentation; only 1-2 misspellings or grammatical errors	Some interference of background, font formats, or graphics with readability and content of the presentation; several misspellings or grammatical errors.	Background, font formats, or graphics make reading and understanding the material difficult OR detract from the presentation; many misspellings or grammatical errors.
Technical Conents of the Presentation	Excellent [10]	Above Average [8]	Average [6]	Poor [4]
PO Mapping	Excellent – All POs are addressed and achieved [10]	Above Average [8]	Average [6]	Poor [4]
Overall Group Performance	The presentation was excellent [10]	The presentation was well done [8]	The presentation was average [6]	The presentation was poor [4]

17.8. Oral Presentation Rubrics for CP1, CP2 and CP3 Followed from Spring 2020 Trimester

The detailed rubric for oral presentation grading is outlined in section 17.7. However, for quick, efficient and real time grading of the presentations the following rubric has been adopted from Spring 2020 trimester and followed since then.

17.8.1. Oral Presentation Rubric for CP1 followed from T201

Assessment Criteria	Total Marks	CO	Description of CO	Corr. PO
Organization of the Talk, Confidence (Individual Performance)	10	CO7	Write professional and technical documents related to the project and orally present project results.	PO10
Time Management, Visual Aid, Slide Design (Group performance)	10	CO8	Work effectively in a team.	PO9

17.8.2. Oral Presentation Rubric for CP2 followed from T201

Assessment Criteria	Total Marks	CO	Description of CO	Corr. PO
Organization of the Talk, Confidence (Individual Performance)	10	CO6	Write professional and technical documents related to the project and orally present project results.	PO10
Time Management, Visual Aid, Slide Design (Group performance)	10	CO7	Work effectively in a team.	PO9

17.8.3. Oral Presentation Rubric for CP3 followed from T201

Assessment Criteria	Total Marks	CO	Description of CO	Corr. PO
Organization of the Talk, Confidence (Individual Performance)	10	CO5	Write professional and technical documents related to the project and orally present project results.	PO10
Time Management, Visual Aid, Slide Design (Group performance)	10	CO6	Work effectively in a team.	PO9

17.9. Hardware Demonstration Rubrics for CP3

Excellent: Exceed expectation (A); Good: Meet expectation (B); Poor: Below expectation (C or below)

Assessment Criteria	Excellent (4)	Good (3)	Poor (0 ~ 2)	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Hardware / Software Implementation	All objectives are achieved, hardware is working properly and project is properly demonstrated	Some of the objectives are achieved, hardware is working but project is not properly demonstrated	Defined objectives are not achieved, and hardware is not working	4	20%	CO1	Design and implement the solutions that meet the specifications.	PO3
Demonstration / Explanation	Explanation of the project is appropriate and well delivered	Explanation of the project is appropriate but not well delivered	Explanation of the project is neither appropriate nor well delivered	4	20%	CO5	Write professional and technical documents related to the project and orally present project results.	PO10
Quality of Workmanship	Excellent quality of design and/or workmanship	Above Average quality of design and/or workmanship	Average quality of design and/or workmanship	4	20%	CO4	Practice ethical and professional responsibilities in the practice of electrical and electronic engineering.	PO8
Originality	Significant evidence of originality and inventiveness.	Limited evidence of originality and inventiveness	Project idea is simple and shows no evidence of originality.	4	20%			
Overall Impression	Excellent	Above Average	Average	4	20%	CO6	Work effectively in a team.	PO9

17.10. Hardware Demonstration Rubrics for CP3 Followed from Spring 2020 Trimester

The detailed rubric for oral presentation grading is outlined in section 17.9. However, for quick, efficient and real time grading of the presentations the following rubric has been adopted from Spring 2020 trimester and followed since then.

Assessment Criteria	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Overall Technical Quality, Project Achievement as per Target	5	50%	CO1	Design and implement the solutions that meet the specifications.	PO3
	5	50%	CO7	Cite relevant references from appropriate sources and discuss the learning gaps and accomplishments under perceived difficulties.	PO12

17.11. Poster Presentation Rubrics for CP3

Assessment Criteria	Rubrics	Total Mark	CO Marking	CO	Description	Corr. PO
Abstract	Justification for the study is well-explained	15	15%	CO5	Write professional and technical documents related to the project and oral ly present project results.	PO10
Objectives	Project objectives are clear and precise	15	15%			
Methods	Clear description of methods used Methods are appropriate to address the problem/objective	15	15%			
Results	Figures/tables/block diagrams are used appropriately and clearly with well-explanation to present the data	15	15%			
Conclusions	Conclusions are supported by sufficient and appropriate results	15	15 %			
References	Relevant previous works are reviewed thoroughly References are cited appropriately	10	10%	CO7	Cite relevant references from appropriate sources and discuss the learning gaps and accomplishments under perceived difficulties.	PO12
Overall Presentation	Effective overall aesthetic/organization of poster Clear demonstration of study	15	15%	CO6	Work effectively in a team.	PO9

17.12. Poster Presentation Rubrics for CP3 Followed from Spring 2020 Trimester

The detailed rubric for oral presentation grading is outlined in section 17.9. However, for quick, efficient and real time grading of the presentations the following rubric has been adopted from Spring 2020 trimester and followed since then.

Assessment Criteria	Total Mark	CO Marking	CO	Description of CO	Corr. PO
Overall Poster Presentation	10	100%	CO6	Work effectively in a team.	PO9